No. 8300102

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Holden's Foundation Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HERETO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'LH145'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this 29th day of June in the year of our Lord one thousand nine hundred and eighty-four.

Attest:

Kenneth A. Evans
Commissioner
Plant Variety Protection Office
Livestock, Meat, Grain & Seed Division
Agricultural Marketing Service

John R. Block
Secretary of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

FORM APPROVED
OMB NO. 40-R3822

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY	1b. VARIETY NAME	FOR OFFICIAL USE ONLY
EX 654	LH145	PV NUMBER 8300102
2. KIND NAME: Field Corn	3. GENUS AND SPECIES NAME: Zea mays	FILING DATE: 4/5/83 — TIME: 9:30 A.M. ~~P.M.~~
4. FAMILY NAME (BOTANICAL): Gramineae	5. DATE OF DETERMINATION: 1980	FEE RECEIVED: $ 1,000 / $ 500.00 — DATE: 4/5/83 / 5/18/84

6. NAME OF APPLICANT(S)	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*	8. TELEPHONE AREA CODE AND NUMBER
Holden's Foundation Seeds, Inc.	R.R.#2, Box 839 Williamsburg, Iowa 52361	319-668-1100

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION	11. DATE OF INCORPORATION
Corporation	Iowa	1968

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS:

Mr. Art Johnson
P.O. Box 839
Williamsburg, Iowa 52361

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- [X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- [X] 13B. Exhibit B, Novelty Statement.
- [X] 13C. Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*
- [X] 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [ ] YES [X] NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED?
[ ] YES [X] NO	[ ] FOUNDATION [ ] REGISTERED [ ] CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? [X] YES [ ] NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

3/18/83 (DATE) — (SIGNATURE OF APPLICANT)

(DATE) — (SIGNATURE OF APPLICANT)

FORM GR-470 (1-78)

13A Addition
Exhibit A:

LH145 was developed through a pedigreed system of breeding. On the following page is a schematic description of the development of LH145. Also included are copies of Holden's Foundation Seeds nursery books. The rows associated with the development of LH145 have been underscored.

Upon observing the increase of LH145 as a finished line for 3 generations, it is free of variance within the population.

Attached is a statement from the originating plant breeder, Art Johnson, Holden's Foundation Seed, stating that the line is uniform and stable.

8300102

Uniformity Statement

I observed LH145 during the three generations it has been increased, Iowa Nursery row, 37985, Elwood Garden field 1982 and Hawaii field 1982-83. In each of the increases the seeds from the previous generation were planted. The line is very stable from generation to generation and is very uniform.

Art Johnson
Plant Breeder

8300102

Exhibit A

Origin and Breeding History of the Variety

LH145 = Ex654 = A632Ht x CM105

Row No.	Pedigree	Location	Year
11562	A632Ht x CM105	Iowa	1976
466	A632Ht x CM105	Iowa	1977
136	A632Ht x CM105	Iowa	1978
5309	A632Ht x CM105	Hawaii	1978-79
7728	A632Ht x CM105	Iowa	1979
10109	A632Ht x CM105	Iowa	1980
27985	EX654	Iowa	1981
W. Elwood Gardens	LH145	Iowa	1982
Curtiss 14-C1	LH145	Hawaii	1982-83

Exhibit B

LH145

LH145 most closely resembles A632Ht; however, the most distinguishing characteristic is the tassel. The lateral branch angle is in the 30° - 40° range for the LH145, while the lateral branch angle of the A632Ht is greater than 45°. This can be seen in the picture on the next page, referred to as Figure 1.

Figure 1.

Addition:

On the right is the LH145 tassel and the A632Ht tassel is on the left.

FORM APPROVED: OMB NO. 40-R3822

EXHIBIT C
(Corn)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY

CORN *(ZEA MAYS)*

NAME OF APPLICANT(S)

Holden's Foundation Seeds, Inc.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*

R.R.#2, Box 839
Williamsburg, Iowa 52361

FOR OFFICIAL USE ONLY

PVPO NUMBER 8300102

VARIETY NAME OR TEMPORARY DESIGNATION

EX654 or LH145

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. TYPE:

[2] 1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNAMENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

[7] 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability): *(Under "comments" (pg. 3) state how heat units were calculated)*

[6][0] DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK	[1][2][9][4]	HEAT UNITS
[ ][ ] DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY	[ ][ ][ ][ ]	HEAT UNITS
[ ][ ] DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE	[ ][ ][ ][ ]	HEAT UNITS

4. PLANT:

[2][0][7] CM. HEIGHT (To tassel tip)

[0][8][2] CM. EAR HEIGHT (To base of top ear)

[1][5] CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

[1] 1 = NONE 2 = 1–2 3 = 2–3 4 = > 3

Number of Ears Per Stalk:

[2] 1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

[1] 1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify) _____

5. LEAF (Field Corn Inbred Examples Given):

Color: 7.5 Gy 5/6 = Munsell Color charts for Plant Tissues

[ ] 1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY DARK GREEN (K166)

Angle from Stalk (Upper half):

[2] 1 = < 30° 2 = 30–60° 3 = > 60°

Sheath Pubscence:

[1] 1 = LIGHT (W22) 2 = MEDIUM (WF9) 3 = HEAVY (OH26)

Marginal Waves:

[2] 1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L)

Longitudinal Creases:

[2] 1 = ABSENT (OH51) 2 = FEW (OH56A) 3 = MANY (PA11)

Width:

[0][8] CM. WIDEST POINT OF EAR NODE LEAF

Length:

[0][7][8] CM. EAR NODE LEAF

[1][2] NUMBER OF LEAVES PER MATURE PLANT

6. TASSEL:

[0 6] NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

[2] 1 = < 30° 2 = 30–40° 3 = > 45°

Peduncle Length:

[0 0] CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

[2] 1 = LIGHT (WF9) 2 = MEDIUM 3 = HEAVY(KY21)

[2] **Anther Color:** 1 = YELLOW 2 = PINK 3 = RED 4 = PURPLE 5 = GREEN

[6] **Glume Color:** 6 = OTHER (Specify) green with purple stripes

Pollen Restoration for Cytoplasms (0 = Not Tested, 1 = Partial, 2 = Good)

[0] "T" [0] "S" [0] "C" [0] OTHER (Specify Cytoplasm and degrees of restoration) _____

7. EAR (Husked Ear Data Except When Stated Otherwise):

[1 6] CM LENGTH [3 2] MM. MID-POINT DIAMETER [5 8] GM. WEIGHT

Kernel Rows:

[2] 1 = INDISTINCT 2 = DISTINCT [1 4] NUMBER

[1] 1 = STRAIGHT 2 = SLIGHTLY CURVED 3 = SPIRAL

Silk Color (Exposed at Silking Stage):

[1] 1 = GREEN 2 = PINK 3 = SALMON 4 = RED

Husk Color:

[2] FRESH [6] DRY 1 = LIGHT GREEN 2 = DARK GREEN 3 = PINK 4 = RED 5 = PURPLE 6 = BUFF

Husk Extention: (Harvest Stage)

[2] 1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear) 3 = LONG (8–10CM Beyond Ear Tip) 4 = VERY LONG (> 10 CM)

Husk Leaf:

[1] 1 = SHORT (< 8 CM) 2 = MEDIUM (8–15 CM) 3 = LONG (> 15 CM)

Shank:

[0 8] CM LONG [7] NO. OF INTERNODES

Position at Dry Husk Stage:

[2] 1 = UPRIGHT 2 = HORIZONTAL 3 = PENDENT

Taper:

[2] 1 = SLIGHT 2 = AVERAGE 3 = EXTREME

Drying Time (Unhusked Ear):

[2] 1 = SLOW 2 = AVERAGE 3 = FAST

8. KERNEL (Dried):

Size (From Ear Mid-Point):

[1 0.] MM LONG [0 5] MM. WIDE [0 3] MM. THICK

Shape Grade (% Rounds)

[3] 1 = < 20 2 = 20–40 3 = 40–60 4 = 60–80 5 = > 80

8. KERNEL (Dried) : 8300102

[8] Pericarp Color: 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE 5 = BROWN 6 = LIGHT RED 7 = CHERRY RED 8 = VARIEGATED (Describe) colorless brown and light bronze at embryo end.

[1] Aleurone Color: 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) _____

[1] 1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED 7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) _____

[3] Endosperm Color: 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:

[3] 1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH 5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) _____

[2][2] GM. WEIGHT /100 SEEDS (Unsized Sample)

9. COB:

[2][0] MM. DIAMETER AT MID-POINT

Strength: [2] 1 = WEAK 2 = STRONG

Color: [3] 1 = WHITE 2 = PINK 3 = RED 4 = BROWN 5 = VARIEGATED 6 OTHER (Specify) _____

10. DISEASE RESISTANCE (O = Not Tested, 1 = Susceptible, 2 = Resistant):

[0]	STALK ROT (Diplodia)	[0]	STALK ROT (Fusarium)	[0]	STALK ROT (Gibberella)
[2]	NORTHERN LEAF BLIGHT	[0]	SOUTHERN LEAF BLIGHT	[0]	SMUT
[0]	SOUTHERN RUST Race 1	[0]	CORN SMUT	[0]	BACTERIAL WILT
[0]	BACTERIAL LEAF BLIGHT	[0]	MAIZE DWARF MOSAIC	[0]	STUNT
[0]	OTHER (Specify)				

11. INSECT RESISTANCT (O = Not Tested, 1 = Susceptible, 2 = Resistant):

[0]	CORNBORER	[0]	EARWORM	[0]	SAPBEETLE	[0]	APHID
[0]	ROOTWORM (Northern)	[0]	ROOTWORM (Western)				
[0]	ROOTWORM (Southern)	[ ]	OTHER (Specify) _____				

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	A635Ht	Kernel Type	A632Ht
Plant Type	A632Ht	Quality (Edible)	- - - -
Ear Type	A632Ht	Usage	A632Ht

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.

Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous (Authors)

Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize.Cornell A.E.S., Mem. 180. 1935.

The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.

Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S. Bul. 831. 1959.

Butler, D.R. 1954 -- A System for the Classification of Corn Inbred Lines -- PhD. Thesis, Ohio State University.

COMMENTS:

$$GDD = \frac{Tmax = Tmin - 50^{o}F}{2}$$

Tmax = or less than 86°F
Tmin = or greater than 50°F

Exhibit D

LH145

LH145 has some other characteristics that distinguish it from A632Ht. The first is the color. LH145 is lighter in color than A632Ht. When using the Munsell Color Chart for Plant Tissues, the LH145 is classified as 7.5 GY 5/6 and the A632Ht a 7.5 GY 5/4.

Another characteristic is the number of lateral branches. LH145 has fewer lateral branches than A632Ht.

LH145 is shorter than A632Ht in plant height and ear height. The difference is greater for ear height.